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A GUIDE

TO THE

ROYAL BOTANIC GARDEN, CALCUTTA,

BY

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SUPERINTENDENT.

WITH A MAP.

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A GUIDE

TO THE

ROYAL BOTANIC GARDEN, CALCUTTA.

CHAPTER I.

Routes to the Garden.

The Royal Botanic Garden lies on the right bank of the Hooghly, about 4 miles below Government House, and may be reached from thence by three routes.

Route I.—*By the road which, after crossing the Hooghly by the pontoon bridge at Howrah, next crosses the East Indian Railway line by a bridge just above the terminal station,* and then, passing to the left* of the Howrah Court-house and to the right of Messrs. Burn and Company's Engineering works, gradually approaches the river bank, along which it runs to the south-east gate of the Garden. After passing Messrs. Burn and Company's works, the road passes in front of various jute factories and presses, and behind certain timber and coal depôts, crosses a small tributary of the Hooghly (the Sibpur Khal) by a bridge, and then runs in front of the Shalimar† House and Rope-work, the workshop of the Government Engineering College, and lastly the College itself. The road ends at one of the gates of the Garden, which is called the **College Gate. And this guide book is arranged for a visitor entering by that gate.**

Route II.—*By the Strand Road on the Calcutta side of the Hooghly,* which runs close by the river, having the shipping on its right and the maidan on its left until Tolly's Nullah is crossed by a bridge. After crossing that nullah, the road leaves the river bank and is carried between the Kidderpore Dock and its tidal basin by a swing bridge. It next passes (on the right) the depôts of the India General and Peninsular and Oriental Steam

* The Garden may also be reached by following the road which, running to the right of the Howrah Court-house and Hospital, crosses the Howrah maidan diagonally, and then runs through the bazars of Howrah, Ramkristopur, and Sibpur, passes behind the Shalimar Rope-work, the Engineering College workshop and grounds, and ends at a gate at the north-east corner of the Garden—*see* page 28. *Visitors entering by this gate should turn sharp to the left and go along the Hamilton Avenue until the College gate is reached.*

† The grounds of Shalimar House, which are now occupied by a rope-work, formed in last century the private garden of Colonel Robert Kyd, a native of Forfarshire the founder of what is now the Royal Botanic Garden.

Navigation Companies. After passing these, the road continues to run parallel to the river, but separated from it by a row of mills, houses, and gardens. It is, however, connected with the river by two roads, which join it at right angles at Nemak Mahal and Mattiabruj* ghats, at either of which the visitor can hire a boat to cross to the floating landing stage in front of the *Water gate* of the Garden.

ROUTE III.—*By river the whole way to the Water gate*, boats† for the journey being obtainable at any ghat in Calcutta or Howrah.

NOTE.—Drinking water of good quality is not to be had in the garden, and no refreshments of any kind are obtainable in it. No objection, however, is made to visitors bringing and consuming refreshments of their own providing.

There are two retiring rooms for ladies and two for gentlemen in the garden, the situations of which are indicated by labels near them: they are also marked on the map.

CHAPTER II.

History of the Garden.

THE suggestion to form a Botanic Garden here was first made to the Government in Calcutta in June 1786 by Colonel Robert Kyd, of the Honourable Company's Engineers, then Superintendent of the Company's Dockyard at Kidderpore. The proposal was favourably entertained by the Governor-General, and its adoption was recommended to the Supreme Board in London during the same month, practical effect being given to it during the following year by the selection, as a site, of a large piece of land immediately below Colonel Kyd's private garden at Shalimar. This piece of land, besides the Botanic Garden as it is now limited, included about 50 acres which form part of the grounds of the present Engineering College. Colonel Kyd was himself an ardent horticulturist, and he had brought together in his private garden at Shalimar a large collection of exotic plants, chiefly from the Straits. He was therefore very appropriately appointed the first Superintendent of the Botanic Garden which had been founded at his suggestion. Colonel Kyd continued to perform the duties of Superintendent of it until his death in 1793. On Colonel Kyd's death, Government decided to put the Garden under the charge of a special officer, who should have no other duty. Dr. William Roxburgh, the Company's Botanist in Madras, was therefore transferred from that Presidency, and was installed

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* Sometimes also called Bichali Ghat.

† Boatmen invariably try to extort excessive fares from strangers. It may therefore be of use to mention that a liberal rate for crossing from Nemak Mahal to the Garden is 4 to 6 annas, and from Mattiabruj 2 annas. The whole journey from Calcutta by river (route 3) should not cost more than 8 annas to 1 rupee, according as the tide is favourable or adverse.

at Sibpur in November 1793. No better selection than that of Dr. Roxburgh could have been made. Dr. Roxburgh, for many years prior to his transfer, had been engaged in studying the then little known Flora of the Northern Circars in the Madras Presidency. He was a most ardent and enthusiastic botanist, and a good gardener. Dr. Roxburgh continued to be Superintendent until 1813, when he was obliged to proceed to the Cape on account of his health. From the Cape he went on to St. Helena, and from thence to Scotland, where he died in 1815. Dr. Roxburgh was the first botanist who attempted to draw up a systematic account of the plants of India. During his busy life in this country he prepared a *Flora Indica*, which contained systematic descriptions of all the indigenous plants known to him, as well as of many exotics then in cultivation in this Garden and in the neighbourhood of Calcutta. The manuscript of this work he took with him when he left India, intending to publish it during his residence in Scotland. His death prevented the execution of this plan; and with the exception of the first volume, which was printed (in two parts) with some additions and interpolations by Drs. Wallich and Carey in 1820, the work remained unpublished until 1832. In the latter year it was printed, exactly as the author had left it, by the piety of his sons, Captains James and Bruce Roxburgh, neither of whom was a botanist. This book is the basis of all subsequent Indian botanical works. It is an admirable production: the descriptions are accurate and graphic, and its authorship justly entitles Roxburgh to his title of the "Father of Indian Botany." Until the year 1872, when the publication of the "Flora of British India" was begun by the distinguished botanist Sir Joseph Hooker, Roxburgh's was the only single book through which a knowledge of Indian plants could be acquired. A second edition of this excellent manual was issued by Mr. C. B. Clarke in 1874, at a merely nominal price, Mr. Clarke's desire being to put the book within the reach of the poorest student. Besides the "Flora Indica," Roxburgh published, at the expense of the Honourable Company, in three large folio volumes, his *Plantæ Coromandelianæ*, being descriptions, with figures, of 300 of the most striking plants of the Coromandel Coast.

Dr. Roxburgh was immediately succeeded in the Superintendentship of the Garden by Dr. Francis Buchanan (afterwards Hamilton), who at the time was on special duty in connection with an extended enquiry into the agriculture of India and in the collection of materials for a gazetteer. Dr. Hamilton, who was an accomplished botanist and zoologist, collected a vast mass of material, part of which was published in his own name; but the bulk of it, after many years' suppression, was published under the title of "Montgomery Martin's History, Topography and Statistics of Eastern India." Dr. Buchanan-Hamilton held charge of the

Garden for only a short time, and he was succeeded in 1817 by Dr. Nathaniel Wallich, lately Surgeon to the Danish Settlement at Serampore. Dr. Wallich was an able and most energetic botanist, who during the earlier part of his term of office organized collecting expeditions into the remote and then little known regions of Kumaon, Nepal, Sylhet, Tenasserim, Penang, and Singapore. Dr. Wallich, in fact, undertook a botanical survey of a large part of the Indian Empire. The materials (in the shape of dried specimens of plants) thus accumulated were taken by Dr. Wallich to London; and after being named there by himself and by other botanists, they were distributed in numbered collections to the leading botanical institutions in Europe. In this great distribution Dr. Wallich included the collections of several other botanists which had been made over to him for the purpose. The liberality with which these specimens were given away was so extreme that, in the Garden report for the year 1843, we find Dr. Griffith (who had been appointed to officiate for Dr. Wallich during his absence in England) complaining that the herbarium had been completely denuded of every specimen collected during the first fifty years of the existence of the Garden. Besides distributing these enormous collections, Dr. Wallich was enabled, through the munificence of the Honourable Company, to publish, under the title *Plantæ Asiaticæ Rariores*, three superb volumes illustrated by coloured figures of a high degree of excellence. Dr. Wallich retired in 1846 and died in 1854.

During the lengthened absence of Dr. Wallich in Europe his place at the Garden was filled by Dr. W. Griffith, whose premature death deprived botanical science of one of its ablest and most industrious votaries. Dr. Griffith's extensive notes and numerous drawings were, after his death, published by Government in nine volumes. Dr. Wallich was succeeded by Dr. Hugh Falconer, F.R.S. Dr. Falconer was a palæontologist, well known by his researches on the Sivalik Fossil Mammalia. In 1855 he left the country on account of ill-health, and was succeeded as Superintendent by Dr. Thomas Thomson, F.R.S., a traveller and botanist of much ability, the coadjutor of Sir Joseph Hooker in the collection and distribution of an extensive and well-known herbarium of East Indian plants, and the joint author of the first volume of a new *Flora Indica*. Dr. Thomson retired in 1861, and was succeeded by Dr. Thomas Anderson, whose untimely death in 1870 was caused by disease contracted during his efforts in connection with the introduction of the quinine-yielding Cinchonas into the Sikkim-Himalaya. For the two years subsequent to Dr. Anderson's departure from India, Mr. C. B. Clarke, F.R.S., acted as Superintendent; and during his incumbency he began the series of botanical publications which has earned for him so high a scientific reputation.

From the first foundation of the Garden it was understood that it was to be made a source of botanical information for the possessions of the Company, and at the same time a centre to which exotic plants of economic interest could be imported for experimental cultivation, and from which, in turn, they could be issued for distribution in the Company's possessions. It was also intended to assist in introducing indigenous Indian products to new markets. It was intended that it should not only be a botanical, but also a horticultural and agricultural garden.

The preceding paragraph shows how the botanical work laid out for the Garden has been accomplished. But the economic side has by no means been neglected. At first great hopes were entertained that the spices which rendered the trade of the Company with the Moluccas and other of the Malayan islands so valuable might be cultivated in Bengal. The earliest efforts of Colonel Kyd were therefore directed to the introduction of the trees which yield nutmegs, cloves and cinnamon, and of the pepper vines. It was, however, speedily proved that the climate of Northern India is quite unsuited to these equatorial species. The equatorial fruits, such as mangosteen, langsat, dukko, and bread-fruit, were also tried with a similar result; and so were the temperate fruits of Europe. In fact, no small part of the benefits conferred on the country by the Garden in its early days was the demonstration by practical experiment that certain natural products, many of them of a most desirable kind, cannot be grown in Bengal; much money and bootless effort being thus saved to the country. The cultivation of the teak tree, for the sake of its timber, then so invaluable for ship-building, was also begun on a large scale and was continued for 35 years, by which time it became clear that, although the tree to all outward appearance grows well on the muddy soil of the Gangetic delta, its stems early become hollow near the base, and are incapable of yielding sound timber of large scantling. The introduction of exotic timber trees also received early attention; and in the Garden there still remain a few of the original mahogany trees introduced in these early years. The introduction of tea was one of the items put down in Colonel Kyd's original programme; and in the final establishment of what has now become one of the most important industries in Northern India, the Garden bore a most important part. Potato-growing was initiated by the agency of the Garden. And the cultivation of the quinine-yielding Cinchonas of the Andes was originated and carried to such a successful issue in the plantation and factory under the direction of Superintendents of this Garden that Government hospitals and dispensaries have for years been supplied from this source with all the quinine required for them; while 5-grain doses of the same drug can be purchased for a pice each (a coin about equal in value to an English farthing) at ever

post office in the Province.* In the improvement of Indian cotton, and in the introduction both of that and of jute to the markets of Europe, the Garden authorities worked cordially hand in hand with the Agri-Horticultural Society of India, with what success it is unnecessary to point out. By the introduction of some of the best kinds of sugarcane from the West Indies, and the dissemination of these to all parts of the country, a considerable improvement was effected both in the quality and quantity of the sugar crop of the country. In this matter also the Agri-Horticultural Society worked hand in hand with the Garden authorities. Very soon after the establishment of the Society just mentioned, a considerable piece of land in the Garden was made over to it rent-free, and on this land the Society conducted the greater part of its operations for 40 years. In fact, it was not until the year 1872 that the Society's garden was transferred to its present site in Alipore. It is unnecessary to discuss in detail the numerous experiments in the cultivation of economic plants which have been conducted in the Garden since its beginning. A few of the products tried may simply be mentioned. Chief among these are flax, hemp, rheea or ramie, tobacco, henbane, vanilla, coffee (Arabian and Liberian), cocoa, ipecacuanha, aloes, sarsaparilla, jalap, india-rubber, Japanese mulberry, cardamoms, tapioca, and coca. As regards horticulture, it may suffice to say that a large proportion of the kinds of exotic plants now found in private gardens in India have been introduced into the country through the agency of this Garden, and that the improved methods of cultivation which now obtain were to a great extent initiated here.

In 1820 about 50 acres of land belonging to the Garden were made over by Government to the Society for the Propagation of Christian knowledge. And on this land the Society erected the building so long known as Bishop's College, but since 1880 (owing to its retransfer to Government) as the Government Engineering College.

In the year 1864 the Garden was devastated by a cyclonic storm of extraordinary violence, which either uprooted or broke to pieces the majority of the trees in it, and, by blowing down all the plant-houses, hopelessly crushed their contents. The few trees which escaped on that occasion were sadly reduced in number by a second cyclone which passed over the Garden in 1867; and at the present time almost the only trees dating from before 1867 are the great banyan and a smaller tree of the same sort, some peepuls and country almonds, about 20 mahoganies and some palms. It is almost a pity that the occasion of its destruction by

* The medicinal Cinchonas are not tropical trees, and cannot be grown in the climate of Calcutta. The Cinchona plantation and quinine factory of the Bengal Government are therefore located in Sikkim, near Darjeeling.

these cyclones was not taken to abandon the present site and begin a new garden on the Calcutta side of the Hooghly. For, although there are certain advantages in the Garden being so remote from the town, there can be little doubt that the balance is in favour of a site more easily accessible to the residents of Calcutta. The destruction of all shade, which resulted from the removal of the trees, allowed the inveterate weed known popularly as ooloo grass, and botanically as *Imperata cylindrica*, to take possession of the whole of the ground not occupied by roads or flower borders; so that when the present Superintendent assumed charge of the Garden in 1871 it presented rather a sorry appearance. The liberality of the Local Government, under whose control it soon thereafter passed, has made it possible for the garden to be laid out entirely anew. The whole of its area has since that date been treated for landscape effects, sheets of ornamental water have been formed, and with the earth so obtained undulations have been thrown up. New roads and foot-paths have also been made; a building for the Herbarium and three handsome conservatories for the more delicate kinds of living plants have been erected; nursery buildings have been put up, and the Garden staff have been furnished with comfortable houses.

CHAPTER III.

Description of the Garden.

On entering the Garden by the College gate, three roads present themselves to the visitor—(1) on the right, *Hamilton's Avenue;* (2) in the middle, *Kyd's Avenue;* and (3) on the left, *Wallich's Avenue.* The visitor is recommended to follow Kyd's avenue, but before describing the latter a few words may be said about the other two. *Hamilton's** *Avenue* runs in a straight line to the Howrah gate, by which the visitor who follows this guide book will leave the Garden. Looking along Hamilton's avenue from the College gate, observe on the right, and following the boundary wall, a row of low trees of *Saraca indica*, Linn., a species which bears, during the hot weather, on its stem and larger branches, innumerable dense clusters of brilliant yellow or orange-coloured flowers. The tree is, in Northern India, dedicated to Asoka, the famous Buddhist King, whose name it still bears. In the south of India, however, a totally different species (viz., *Polyalthia longifolia*, Hook. fil. & Thoms.) is known as the Asoke

* Francis Buchanan, afterwards Buchanan-Hamilton, born in Perthshire in 1762, died 1837; a member of the Bengal Medical Service and a distinguished Botanist and Zoologist; acted as Superintendent of the Garden after Dr. Roxburgh's death; travelled extensively in India collecting materials for a gazetteer; published "An account of the Agriculture of Mysore, in three volumes, quarto." "An account of the Fishes of the Ganges," and other works.

tree (*see* pages 11 and 18). Roxburgh, not identifying the *Asoka* tree of the Bengalis with the *Saraca indica* of Linnæus, named it (after his friend the celebrated oriental scholar, Sir William Jones) *Jonesia Asoka;* and under Roxburgh's name the tree is probably more widely known than under the older name of Linnaeus. On the left of the roadway, note, amongst various others, trees of *Ficus Roxburghii*, Wall., and *F. Mysorensis*, Heyne; and at its far extremity, near the Howrah gate, several of *Ficus Bengalensis*, Linn., and of *F. religiosa*, Linn.; also about the middle a good specimen of the graceful *Anogeissus latifolia*, Wall., a species common in the forests of the Central Provinces, which is remarkable for its beautiful habit, and which yields timber of fair quality.

*Wallich's** *Avenue* runs from the College gate along the river bank to the Water gate, by which gate visitors by routes (2) and (3) enter the Garden. The tree which forms the avenue on the south side along its whole course is *Terminalia Catappa*, Linn., a Malayan species much cultivated in Bengal. The fruit of this tree is about the size of a large walnut, but is more elongated. Its outer pulp is much eaten by frugivorous bats; and the kernel, which consists chiefly of the beautifully convoluted white cotyledons, or seed-leaves, is much in favour with Europeans, by whom it is known as *the country almond*. Botanically, however, the species has little to do with the real almond. The *Catap*, in situations where it has plenty of room, developes into a magnificent tree (note one or two specimens to the north of this avenue) with finely buttressed trunk and a glorious leafy head. On the narrow strip of land between this avenue and the river, observe several fine specimens of the noble palm *Corypha elata*, Roxb., a species which flowers but once and then dies. When it does flower, the inflorescence is in length equal to about a sixth of the total height of the tree, a proportion which, however, is much exceeded in the allied species *C. umbraculifera*, Linn., a native of Ceylon. Two specimen trunks of *C. elata* grown on this very piece of ground may be seen in the timber museum in the Royal Garden, Kew. These two specimens show the spiral lines of the leaves running in different directions—an arrangement which upsets the statement made in many botanical text-books, to the effect that the leaf spirals in every individual of any species invariably run in the same direction, *i.e.*, either from right to left, or from left to right. On the right the road passes along the southern side of the bamboo grove (described under Kyd's avenue); passes the end of a cross road (Collett's avenue); next skirts the end of a large sheet of water, on which observe a few plants of the Amazon water-lily (*Victoria regia*, Lindl.),

*Named after Nathaniel Wallich, F.R.S., a native of Denmark, for 30 years Superintendent of the Garden, a distinguished Botanist, who died in 1854—(*see* chapter 1, page 4).

and during the hot and rainy seasons hundreds of plants of the white-flowered variety of the sacred Padma water-lily (*Nelumbium speciosum*, Willd.) The road then passes in front of the dwelling-house and office of the Curator of the Garden, and ends close by at the *Water gate*. In front of the Curator's house observe, climbing on tall trees, fine plants of *Bougainvillea spectabilis*, Willd., *B. lateritia*, Hort., and *B. glabra*, Choisy, the bracts of which, when in full flower, present masses of colour many square yards in extent and of extraordinary brilliance.

*Kyd's** *Avenue* runs from the College gate to Kyd's monument. In passing along it from the College gate, observe on the left a triangular group of small trees. These are hybrids of two or three species of *Brownea*. The genus *Brownea* is Tropical American and West Indian. Three true species of it are grown in the Garden, viz., *B. coccinea*, Jacq., *B. ariza*, Benth., and *B. grandiceps*, Jacq.; and between these Mr. John Scott† (a former Curator of the Garden) succeeded in raising many hybrids. Mr. Scott's hybrids are chiefly between *B. grandiceps* and *B. ariza:* they have flower heads something like those of *Rhododendron*, the petals being scarlet or red, according as the influence of *B. ariza* or *B. grandiceps* preponderates. The trees forming the first section of this avenue are *Swietenia macrophylla*, King, a species of mahogany closely allied to the true mahogany, but having larger leaves, flowers, and fruits. The seeds from which the trees in this avenue were raised were received from Honduras as those of true mahogany. Shortly after their germination it became clear that the resulting seedlings were not ordinary mahogany (*Swietenia mahogani*, Linn.) Some years ago the young trees flowered and fruited, and it then became clear that they belonged to an undescribed species of the genus *Swietenia*, which, on account of the large size of its leaves, was named *S. macrophylla*. This species differs from the true mahogany in flowering earlier and in seeding freely.

Where the road begins to pass between the two arms of a lake, observe on the left a young but very handsome specimen of *Bambusa arundinacea*, Willd.—one of the finest of this beautiful and useful group of arboreal grasses. Further along on the same side, and beyond the lake, there is a large collection of bamboos from various parts of South-Eastern Asia. In this grove will be found specimens of one of the beautiful black-stemmed Malayan species, and also a specimen of another sort, *B. vulgaris*, Schrad., var. *striata*, of which the stems are bright yellow with vertical green

* Named in honour of Colonel Robert Kyd, founder of the Garden, who died in 1793 (*see* chapter II, page 2).

† John Scott, born in Denholme, Roxburghshire, a horticulturist of great intelligence, and a keen and sagacious observer; the author of papers in the Journal of the Linnean Society and of the Asiatic Society of Bengal, and a correspondent of Darwin. Curator of this Garden from 1864 to 1880 (*see* page 22).

lines, a pattern which is repeated (or used to be repeated) in England on the vertical supports of portable shower-baths in private houses. By far the most beautiful of the bamboos in this collection are those which skirt the Collett* avenue. Those are chiefly natives of Java, and belong to the genus *Melocanna*, some of the species of which have seeds as large as olives, whereas the fruits of the majority of bamboos are of the size, and have much the appearance, of oats. By far the larger proportion of the species of bamboo flower but once in their lives, and then die. This peculiar habit they share with some palms (*see* page 8), and with many species of *Acanthaceæ*. At one of the corners formed by the intersection of the Collett avenue there is a fine group of palms, the largest and most striking of which are plants of *Corypha Gebanga*, Blume, a Malayan species.

The *Kyd Avenue* now skirts on the right the part of the Garden known as the Palmetum, to which a separate paragraph is devoted (page 25). The line of trees by the side of the road is now interrupted for a considerable space. Opposite this interruption, and on the left of the road, is an artificial mound which was thrown up by Dr. Wallich while he was Superintendent of the Garden. On this mound, and at its base, he originally planted a collection of trees which he collected in the Nepal Terai during one of his visits to that then (as now) little known country. A few of these trees still remain, the tallest and most notable of which is a fine specimen of *Sterculia alata*, Roxb.—a species of which there are many smaller specimens in Scott's avenue (page 21). On Wallich's mound are many trees of *Pinus longifolia*, Roxb., which is the only species of the genus *Pinus* which can be got to grow in the soil and climate of the Gangetic delta. Compared to the specimens one meets in the outer Himalaya and Siwalik range, where the species is indigenous, these are very poor. Still they are pines; and on a hot day they diffuse the delicious resinous smell with which the traveller in Switzerland or Scotland is so familiar. At the foot of the mound is a granite obelisk erected some years ago by a few friends and admirers to the memory of the distinguished Botanist Nathaniel Wallich—for 30 years Superintendent of the Garden—who died in 1854. At the junction of the Brandist road (on the right) the avenue begins again, and from this point to Kyd's monument it is formed of *Polyalthia longifolia*, H. f. & Th., the tree which in

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* Named after Sir Henry Collett, K.C.B., a distinguished soldier and ardent botanist; joint author with Mr. Botting Hemsley, F.R.S., of a valuable paper in the Journal of the Linnean Society (volume 28) on the Botany of the Shan Hills in Upper Burma.

† Named in honour of Sir Dietrich Brandis, K.C.I.E., F.R.S., the father of Indian forestry, and for many years Inspector-General of Indian Forests; also the author of numerous contributions to the literature of Indian Forestry, and of a *Forest Flora of the North-Western Provinces*.

Southern India is named the Asoke. This, from its dense little-spreading habit, forms a striking avenue tree. It grows slowly, and, although its wood is soft, it is a long-lived species. In Bengal it is often planted in the neighbourhood of temples, and is regarded as a sacred tree—a character which is indicated by its vernacular name "Debdar" ("the tree of God"). What is practically the same name, viz. *Deodar*, is, in the Western Himalaya, given to a member of the pine family (*Cedrus Deodara*, Loud.) The Himalayan Deodar has tufted leaves like the European larch (to which indeed it is botanically closely allied), and is quite unlike any *Polyalthia*. It has, moreover, most durable timber, from which the highly fragrant resin never disappears, no matter how long it may have been cut. The Himalayan Deodar is scarcely distinguishable botanically from the cedar of Lebanon: the Bengali Debdar, on the other hand, belongs to the same family as the custard apple (*Anonaceæ*).

Along the right (north) of this part of the avenue runs an arm of one of the largest lakes in the Garden, and on the left, occupying a low moist piece of ground, is a collection of various species of *Pandanus* or screw-pine. The Pandani form a small family remarkable for their curious agglomerated fruits, which in form much resemble pineapples, and for the curious aërial roots which support the stems, and which are arranged in screws or spirals, whence the familiar name of "screw-pine." The flowers of the Indian species, which is named in the vernacular *Keora*, are very sweet and are much prized on this account. The road now crosses, by a girder bridge, a constricted portion of a lake. A little beyond this bridge the road is crossed nearly at right angles by the Falconer* avenue, and a hundred yards beyond the intersection it ends at Kyd's monument. This monument, which consists of a marble urn and pedestal by Banks, was erected in 1795 to the memory of the founder of the Garden (Colonel Robert Kyd) by his nephew, Major Alexander Kyd. It stands on a raised platform, from which excellent views in all directions are obtained. To the east is the avenue along which the visitor has just travelled. To the north-east runs the Anderson avenue; to the north are the long conservatory, and a sheet of water with swans and other aquatic birds on its surface, while nestling amongst trees on its farther bank is the dwelling-house of the Curator of the Herbarium. To the west runs the Hooker avenue (one of the finest in the Garden), which leads to the Superintendent's house and to the Herbarium; to

* Hugh Falconer, M.D., F.R.S., a native of Forres, Superintendent of the Botanic Garden at Saharanpore for many years, was transferred to the Calcutta Garden on the death of Dr. Wallich. His chief works were palæontological, not botanical. During his lifetime he began (in association with Sir Proby Cautley) to publish an account of the great fossil deposits of the Siwalik range, under the title *Fauna Antiqua Sivalensis*, and after his death (which occurred in 1865) a selection of his miscellaneous palæontological papers was published under the editorship of his nephew, Dr. C. Murchison.

the south-west there is another arm of the water-fowl lake; and running due south to the Water gate and the river is the avenue of Royal Palms (*Oreodoxa regia*, H. B. K), backed by rows of the true mahogany tree (*Swietenia Mahogani*, Linn.) The *Oreodoxa avenue* has much the effect of an aisle in a church, the beautiful grey stems having all the severe grace of slender pillars. This avenue is seen to best advantage by moonlight. At each end of this avenue stand two trees of *Araucaria Cookii*, R. Br., a very formal conifer, not, however, destitute of a certain beauty, the full effect of which is, however, marred by the obstinate determination of the trees to bend away from the direction of the prevailing wind.

Visitors who have reached the Garden by route II or III (see pages 1 and 2), and who have entered by the Water gate, should, on landing, walk up the Oreodoxa avenue to Kyd's monument, and should proceed in a north-easterly direction along

*Anderson's** *Avenue*.—Along the eastern side of the roadway is a row of bamboos consisting chiefly of *Dendrocalamus Hamiltonianus*, Nees & Arn., and *Bambusa vulgaris*, Schrad.; while scattered here and there beside the bamboos are other plants of interest, such as the graceful palms *Dictyosperma album*, Wendl. & Drude, *Livistona chinensis*, R Br., and the curious *Encephalartos caffer*, Miq. On the opposite side from the bamboos, observe fine specimens of a hybrid *Brownea* and of *Amherstia nobilis*, Wall, the beautiful weeping *Dalbergia melanoxylon*, Guill. & Perr, and a group of plants, amongst which the cuneate-leaved *Ficus diversifolia*, Blume, is conspicuous. *Amherstia nobilis*, Wall., is one of the finest flowering trees in the world. The splendid scarlet blossoms dashed with yellow, which have much the *facies* of those of an orchid, are arranged in singularly graceful racemes, to which full effect is given by the beautiful pendant leaves.

Running parallel to the road, and approached by a short avenue of *Araucaria*, is the long conservatory which, by reason of the orchids being exhibited in it while they are in flower, is usually known as the "Orchid House." The conservatory stands pretty nearly on the site of the first structure of the kind, which was built by Dr. Anderson about the year 1864. The idea of this kind of conservatory was taken from the *panbaris* of the Natives of India, in which the Betle pepper is grown for the market. These *panbaris* are low structures, built of bamboo, with flat, thatched roofs. The present conservatory was begun in 1876, and was brought to its present dimensions by additions made a few years later. It is

* Thomas Anderson, M D., native of Edinburgh, a member of the Indian Medical Service and a Botanist of distinction, the introducer of Cinchona cultivation into Northern India, and the first Conservator of Forests in Bengal. Was Superintendent of this Garden from 1861 to 1869. He contributed to the Journal of the Linnean Society various valuable papers on the difficult family of Acanthaceæ, and he elaborated the families of Guttiferæ and Cruciferæ for Sir Joseph Hooker's Flora of British India—(*see* also chapter II, page 4).

constructed of a framework of tee and angle-iron, enclosed on the roof and sides by wire netting. The sides are covered by creeping plants of various sorts, and the roof has fastened on to it a thin layer of thatching grass, the layer being so thin that there are many interspaces. The object of the thatch on the roof and of the leafy covering on the sides is not to exclude light, but to give a gentle, broken shade by day and to prevent radiation from the ground at night. It is not desired to exclude rain, but to admit it freely. The effect of these arrangements is that, inside the house, a rather moist atmosphere can be kept up, which is more equable than that out of doors, being cooler by day and warmer by night. These are the conditions which, in the climate of Calcutta, it is absolutely necessary to supply for the successful cultivation of really tropical plants. Calcutta is situated just within the tropics. It has a cold season during which the thermometer on the grass falls as low as 45° Fht., while during the hot season a hard, pitiless sunlight prevails, which gives a temperature often as high as 100° Fht. in the shade. These extremes make health, or even life, for many really tropical species, an utter impossibility. The fact that the conditions necessary for the cultivation of equatorial species is supplied in this and the other two conservatories in this Garden is best proved by the appearance of the plants now growing in them. Conservatories on this model are now to be found all over India; and, if large enough, they are invariably successful. In a small house, however, or in one with too high a roof, it is, in the parts of India where the natural climate presents much greater extremes of temperature than in Bengal, impossible to secure an artificial climate sufficiently moist and equable for really tropical species. Towards the south end of this building (where the orchids when in season are exhibited) the plants which permanently occupy the house are in pots placed on rustic stages, while a formal stage runs right round the house. In all other parts of it, however, the plants are growing in rockeries in the ground—an arrangement which greatly conduces to health in a country where the operation of watering has to be entrusted to ignorant coolies, whose only idea of it is to drench, and who, quite irrespective of the wants of individual plants, count for righteousness the speedy emptying of their watering-pots. In this conservatory will be found a considerable collection of the family of *Aroideæ*, many Dracænas, a good many ferns, and numerous other plants usually cultivated in stoves in England. The crowning glory of the house is the collection of orchids, which come into flower chiefly during the months of March and April. The orchids cultivated here are mostly natives of India, and they belong chiefly to the genera *Dendrobium Vanda*, *Saccolabium*, *Bulbophyllum*, *Cirrhopetalum*, *Eria*, *Phaius*, *Cœlogyne*, and *Cypripedium*. Many genera of which the flowers are

inconspicuous, and of which the interest is rather botanical than horticultural, are, however, also grown. The collection embraces a few of the tropical species of South and West America, chiefly of the genera *Oncidium* and *Cattleya*. Amongst the objects of economic interest to be found in this conservatory are the *Sarsaparilla* and the *Vanilla* plants, both climbers supporting themselves on tie-rods near the northern door. From the western door of the house a very pretty view may be obtained of the water-fowl lake, on the opposite bank of which are some beautiful groups of trees. Emerging from the house by the northern door, observe on the right a triangular space in which are growing several species of palms, the most beautiful and striking of which are *Ptychoraphis augusta*, Becc., a species known wild only in the Nicobar Islands; the stately *Arenga Wightii*, Griff., from the south of India; and the beautiful golden-flushed *Areca lutescens*, Bory, from the Mauritius; while growing on the wire stays of the house is a fine plant of the deliciously fragrant climber *Aganosma caryophyllata*, G. Don. On the opposite site of the foot-path there is a fine specimen of the *Euphorbia antiquorum*, Linn., the milky juice of which is intensely acrid.

Regaining the Anderson avenue, observe on the right a small pavilion almost entirely covered by climbing plants, where visitors may regale themselves on any food they may bring with them. The chief climbers covering this house are two species of *Ficus*. The one with small fruits (*F. scandens*, Roxb.) is a native of the forests of Northern India. The other, with small leaves on the stems which cling to the wall, and much larger leaves on the fruiting branches which spread outwards, is *F. pumila*, Linn., a native of Japan and Northern China. The figs of the latter are as large as very big walnuts, and, when ripe, have the bloom and colouring of a purple plum. This climber is very commonly planted on houses in Calcutta, where, being kept closely trimmed, the fruiting branches are never allowed to grow, and only the small stem-leaves are to be found. It is often called the "Calcutta Ivy," although it is really far removed from the family to which Ivy belongs. Growing on the east end of the house may be seen a fine plant of a very curious vine with quadrangular, succulent, almost leafless stems, on which, at certain seasons, may be found small black bitter grapes, the taste of which does not in the least recall the delicious produce of an English vinery. This is *Vitis quadrangularis*, Wall., and a native of Bengal. Growing also on the roof of the house are fine plants of *Hoya imperialis*, Lindl. (Malayan), and of *Cereus grandiflorus*, Mill. (S. American).

Beyond this pavilion, the Anderson avenue expands into a wide space, from which it then proceeds almost due northwards in a straight line and ends in a circular carriage stand. From this carriage stand the *Kurz Avenue* curves in a north-westerly direction

to the situation of a proposed new gate on the Andul road; and here also the Roxburgh avenue ends. A little way along the Kurz avenue there is, on the left, a banyan tree much smaller than the great one described at pages 19 and 20, but still a fine specimen. To the left of this opens the Carey avenue, which, after running in a south-westerly direction for a short distance, joins the Jack avenue.

Returning to the pavilion by the side of the Anderson avenue, observe to the north of the pavilion, and skirted by the Griffith avenue, a collection of such coniferous trees as can be grown in the climate of Calcutta. The number of these is very limited indeed, including only several species of *Cupressus* and *Araucaria;* two of *Podocarpus* and *Thuja;* and *Pinus longifolia*, Roxb. At the eastern end of this collection are a few small groups of succulent plants, amongst which may be found the plant which yields the Sissal hemp of commerce (*Agave rigida*, Mill., var. *Sissalana*), and some of the species of *Agave* which yield what is commercially known as "Aloe fibre." The Agaves are of American origin, while the Aloes are African. The latter are represented here by several species. Amongst these succulent plants, but close by the roadway, grow side by side two noteworthy plants. The one is *Adenium obesum*, Rœm. & Sch., a native of Aden; and the other is *Juniperus recurva*, Ham., var. *squamata*—a prostrate, shrubby Juniper which grows naturally at elevations of about 12,000 feet in the Himalaya. I know of no instances which better illustrate the capacity of some species for adapting themselves to conditions widely different from those under which they normally grow. The *Adenium*, which in its own home on the barren rocks of Aden gets a shower of rain once in a year or two, tolerates the moist climate of Calcutta so well that it flowers regularly every year, although its flowers never set seed. The Juniper, although it neither flowers nor fruits here, is perfectly healthy.

Close by is a larger pavilion for the use of visitors; and to the east of it is a considerable expanse of turf in which are dotted beds, which during the end of the cold season are gay with many of the annuals cultivated during summer in European gardens. To the east of this annual flower garden, and by the margin of a pond, there is a large group of palms. In the distance, and on the boundary of the garden, are a few fine mahogany trees originally planted by Dr. Roxburgh and now about a hundred years of age. Near these is a small marble monument to the memory of Sulpiz* Kurz, for 14 years Curator of the Herbarium of this Garden.

* W. S. Kurz, a native of Augsburg in Bavaria, joined the Army of Netherlands India in order that he might see something of the rich botany of the Malayan Archipelago; was for some time Assistant Curator of the Herbarium of the Botanic Garden at Buitenzorg in Java; was appointed Curator of the Herbarium of this Garden in 1864; died in Penang in 1878; was the author of a Forest Flora of British Burma, and of many botanical papers in the journals of various learned societies.

Running behind and parallel to the annual flower garden (and joining, at its southern extremity, the Griffith* avenue, and at its northern the village where the garden labourers live) is the narrow *Rottler*† *Avenue*. Passing from the annual garden along a narrow walk lined with Araucarias, and crossing the Anderson avenue, the visitor reaches conservatory No. 2. This house is built on the same principle as the longer one already described, but the roof is higher. Climbing along the inside of the eastern wall of this house is a plant of *Aristolochia saccata*, Wall, which, towards the end of the cold season, bears satchel-shaped flowers of singular elegance, quite unlike those of any other *Aristolochia* known to me, the corolla being edged with what looks like purple plush. Passing through the south door of this house, the visitor emerges on the *Griffith Avenue*, near Griffith's* monument. Overhanging this monument is one of the most beautiful trees in the garden, *Albizzia paludosa*, Benth. MSS., a native of Mexico. Passing to the right, observe a little to the south of the road a monument to W. Jack, and overhanging it a rather fine specimen of *Parkia Roxburghii*, Don, which bears during the hot season numerous small flowers crowded in globular heads, and as each head is mounted on a long stout stalk, the resemblance to a drumstick is complete. Near this is the Palm-house at which the Griffith avenue ends.

The *Palm-house* is an octagonal structure with a central dome 50 feet high. This house is built on the same principle as the two conservatories already described; but owing to its greater size, and particularly to its greater height, much stronger materials have been used in its construction. The house is primarily intended, as its name indicates, for the cultivation of equatorial species of palms which cannot be grown out of doors. Numerous plants other than palms are, however, grown in it, including many scandent species, for which its high pillars and wide roof afford excellent scope. Every plant in this house is grown in the ground; and nowhere could the superiority of cultivation in the ground to cultivation in pots be better illustrated. The house contains a large and varied collection of tropical plants, both of economic and of horticultural interest, to describe which would require more space than can be given in this guide book.

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* William Griffith, born at Ham Common, Surrey, a Surgeon in the Honourable Company's Madras Establishment, and one of the most brilliant of Indian Botanists. He accompanied the punitive expedition to Cabul in 1839; formed one of the Botanical deputation which explored Assam in connection with the search for, and discovery of, the tea plant, explored the Malayan Peninsula, amassed enormous collections of dried plants, which were ultimately distributed from Kew after his death. died at Malacca in 1845. His collected works were posthumously published in nine volumes undert he editorship of Dr. McLelland, and at the expense of the Honourable Company which he had served so enthusiastically

† Rottler was one of the group of scientific Botanists who, during the later years of the last and the earlier years of the present century, formed a Society for the promotion of the knowledge of Indian Botany. Other members of this Society were Sir W. Jones, Fleming, Hunter, Anderson, Berry, John, Roxburgh, Heyne, Klein, and Buchanan-Hamilton. Each of their names has been associated with a genus of Indian plants

In front of the Palm-house is a broad space from which four roads diverge—(1) *The Griffith Avenue*, by which the visitor has just travelled; (2) *The Jack* Avenue*, which runs due north for a short distance to where it is joined by the *Carey† Avenue* on the right, then curving to the north-west joins Roxburgh's avenue; (3) *The Thomson‡ Avenue*, which begins by making a bold curve to the southward, and then running due north crosses the Roxburgh avenue and ends at a point on the northern boundary of the Garden, where it is hoped a new gateway may be made opening on to the Andul road, thus affording an alternative route from Howrah; (4) *The Clarke§ Avenue*, which runs in a southerly direction and joins the Hooker avenue at a point where there grows a fine specimen of the Talipat Palm (*Corypha umbraculifera*, Linn.) The Talipat is one of the most stately and beautiful members of the Palm family. But apart from these merits, the species is of great interest, from the fact that the leaves of it form the materials on which some of the oldest Sanskrit manuscripts were written. This distinction it shares with a Himalayan Birch (*Betula utilis*, D. Don), the thin bark of which was also used as a writing material in very ancient times. About the middle of the Clarke avenue there is a very fine group of mahogany trees about 70 years old; also a very old tree of *Vitex leucoxylon*, Linn. fil., a survivor of the great cyclones of 1864 and 1867, which reduced it to its present rather ruinous condition. On the west of this avenue are fine trees of *Chloroxylon Swietenia*, DC. (the Satin wood tree), *Schleichera trijuga*, Willd., two groups of *Pithecolobium Saman*, Benth. (the Rain-tree of the West Indies), *Inocarpus edulis*, Forst. (the Otaheite chestnut), and of *Cassia Fistula*, Linn. (the Indian Laburnum); while on the east of it is a group of trees of *Ilex Paraguensis*, A. St. Hil. (the source of the Paraguay tea), and a very fine specimen of *Terminalia Catappa*.

The visitor should now retrace his steps and return to the *Thomson Avenue*, which passes between two lakes. By the margin

* W. Jack, M.D., a native of Aberdeen, a member of the Honourable East India Company's Medical Establishment, was Surgeon to Sir Stanford Raffles while Java was held by the British Government. Jack was the discoverer of many remarkable plants, which he described in the *Malayan Miscellanies*. A career of much botanical promise was cut short by his premature death in 1822 at the age of 27.

† Carey, the distinguished missionary, the first translator of the Bible into an Indian vernacular; was also a keen botanist, who, in his garden at Serampore, collected an immense number of plants, both indigenous and exotic. Dr. Carey began to publish in 1820 the Flora Indica of his late friend Dr. W. Roxburgh. The work, however, was not carried beyond its second part.

‡ Thomas Thomson, M.D., F.R.S., a native of Glasgow, of the Honourable Company's Bengal Medical Service; Superintendent of this Garden from 1855 to 1861; joint author with Sir Joseph Hooker of the Flora Indica, a work which was not carried beyond its first volume (*see* chapter II, page 4).

§ C. B. Clarke, M.A., F.R.S., of the Bengal Educational Establishment, who for some time acted as Superintendent of this Garden; a distinguished Botanist, who is at present President of the Linnean Society of London; author of numerous botanical papers; of a folio volume on the *Commelinaceæ* and *Cyrtandraceæ* of Bengal; and a large contributor to Sir Joseph Hooker's Flora of British India.

of the lake on the right hand is a fine group of *Pandanus furcatus*, Roxb. The lake on the left is a branch of the largest sheet of water in the Garden, and on its banks, as well as on the islands in it, are many pretty groups of trees. The road, after expanding into a broad open space, turns sharp to the north and passes through a double avenue of hybrids of *Brownea*, and of trees of *Albizzia paludosa*. The tall grey stems of the latter tower high above the leafy masses of the low and much-branched *Brownea*, the effect being very good. The Thomson avenue intersects the Roxburgh avenue at right angles, and then runs due north to the Garden boundary. Beyond the point of intersection the lines of *Brownea* are replaced by *Amherstia nobilis*, Wall. (*see* pages 12 and 28). Near the point of intersection observe a splendid tree (one of the two finest in the Garden) of *Terminalia Catappa*, and also one of *T. belerica*, Roxb. The dried fruits of the latter contain a large quantity of tannic acid, and, along with the fruits of some other species possessing a similar chemical constitution, they are exported to Europe as a tanning material under the commercial name of *Myrobolans*. The fruits of the former, as has already been stated (page 8), are eaten as dessert.

The visitor need not follow the Thomson avenue beyond its intersection with the Roxburgh avenue; but, turning to the left (westward), he should follow the latter. From this point the avenue is lined by trees of *Polyalthia longifolia* (*see* pages 8 and 10). To the south of this part of the avenue is a collection of trees, chiefly belonging to the natural order *Leguminosæ*. Where the lines of *Polyalthia* end, there is, on the right, a small mound, on the top of which is a monument to the memory of Dr. Roxburgh,* "the Father of Indian Botany," and the author of the *Flora Indica* (*see* page 2). The inscription on the monument is by Bishop Heber.† In the open space on the opposite side of the road from

* William Roxburgh, Surgeon in the Honourable Company's Madras Establishment, born in Ayrshire, 1750, died at Edinburgh, 1815; Superintendent of this Garden from 1793 to 1813; author of Flora Indica, 3 volumes (reprinted under the editorship of Mr. C. B. Clarke, F.R.S., in a single volume, and sold at the nominal price of 5 rupees); author also of The Plants of Coromandel, 3 volumes folio.

† As the inscription is not very legible, a copy of it is given here:—

Quisquis ades
Si locus suavitate mentem permulcet
Aut admonet ut pie sentias de Deo
Habendus in honore tibi

Roxburghius

Horum hortorum olim præfectus
Vir scientiæ botanices laude florens
Idemque amœnitatum agrestium

Summus artifex

Conservat cinerem Patria
Hic viget ingenium
Tu fave et perfruere

B. M. P. C. Superstites Amici A.D. 1822.

this monument, observe an artificial mound planted with trees of *Pinus longifolia*, Roxb.

The road from the monument runs straight to the great Banyan tree, and, there dividing, it sends branches which encircle the plot of ground on which the tree stands. On a mound at the left hand corner, just before reaching the Banyan, observe a group of Myrtaceous trees, amongst which are specimens of such of the Australian Gum trees (species of *Eucalyptus*) as can be grown in the, to them, uncongenial climate and soil of the Gangetic Delta; also observe a number of specimens of the Cajaput oil tree (*Melaleuca Leucadendron*, Linn.) By the edges of this group there have been planted, on account of the brilliance of its flowers during the hot weather, some shrubs of the indigenous *Woodfordia floribunda*, Salisb. The petals of this shrub are scarlet and orange, and they are collected in the jungles, where the bushes grow wild, to be used as a dye-stuff. The Cajaput tree merits a passing notice on several accounts. Its white birch-like bark, which often attains a thickness of nearly an inch, is formed of layer upon layer of easily separable papery-looking tissue. The small wart-like fruits adhere like rows of large scale insects to the smaller branches just below the leaves; while the latter are rich in a pungent oil, which is largely extracted by native drug-dealers, and which has a considerable popular reputation as a rubifacient and counter-irritant in muscular rheumatism.

The *great Banyan tree* (*Ficus Bengalensis*, Linn.), which is the pride and glory of the Garden, more resembles a small forest than a single tree. This appearance is caused by the roots, which, growing out of the branches, run vertically to the ground, and each of which has all the appearance of a trunk. This habit of sending down aërial roots from the branches is not uncommon in the great genus *Ficus*. But in the Banyan the habit attains its most striking development. The main trunk of the Banyan was (in December 1894) about 51 feet in girth, and the aërial roots which had actually reached the ground at that date numbered 378. New roots are, however, continually being formed; and, at the date just mentioned, these numbered about 100. As the visitor may see for himself, these aërial roots are thrown out at the places where support for the horizontally spreading branches is most required. The circumference of the leafy head of this tree is, if its sinuosities be followed, 976 feet; but if these be neglected, 858 feet. The tree is not symmetrical, and the main stem does not stand on the centre of the space covered by it. The long diameter of that space is 287 feet, and the short diameter 264 feet. These irregularities are in part due to the breaking of branches by the severe storms of wind which are so frequent during the hot season; but they are chiefly due to the great cyclones of 1864 and 1867, which, besides making a complete wreck of the

majority of other trees growing in the Garden, also removed from this one several of the largest limbs on its western and northern sides. The southern part has, however, hitherto entirely escaped damage by storms; and it is in this part of the tree that the most characteristic features of the species may be observed. The age of the tree is not actually known. The tradition current in the neighbouring villages is that, when the Garden was first established in 1786, this banyan was quite a small tree growing (as banyans often do in early life) on the top of a wild date-tree, under which a holy beggar (fakir) used daily to sit. According to this tradition, the tree would probably now (1894) be about 125 years old. My own opinion is that the tree is older than this. This opinion is founded on observation of the rate of the growth of this tree itself since the year 1871, and of the growth of other banyans familiar to me. My opinion derives support from the reference made to this tree in Lord Valentia's Travels to India, Ceylon, the Red Sea, &c. (volume 1, page 39). This traveller visited Calcutta in the year 1803, and the Botanic Garden banyan was apparently then a tree of note, for he visited the Garden chiefly to see it. His account of it is as follows:—"The finest object in the Garden is a noble specimen of the *Ficus bengalensis*, on the branches of which are nourished a variety of specimens of parasitical plants and ferns." This banyan is the largest which I have myself seen. I am informed, however, on good authority, that there is a larger one near the hill fort of Wysatghar, about 3 miles west of the main road connecting Poona and Kohlapur, and about 20 miles from Satara (in the Bombay Presidency). Casual observers are, however, apt to be misled as to the real size of individual banyan trees. For it is—or rather it was—a common practice in various parts of India to plant these trees in groups of four or five; and after the lapse of years it becomes very often difficult to determine where one individual of such a group ends, and where another begins. If examined critically, the great tree at Wysatghar may thus be resolved into a group of trees.

The great Banyan stands near the western limit of the Garden. From the circular road which surrounds it three straight roads radiate—(1) *that part of the Roxburgh Avenue by which the visitor has already travelled;* (2) *the continuation of the Roxburgh Avenue*, which, passing alongside a row of large mahogany trees planted by Roxburgh about 100 years ago, curves towards the river (crossing the Hooker avenue in its course), and then running along the river bank for 350 yards, ends at the Water gate (page 3); (3) the *Banyan Avenue*, which runs straight from the tree to the Water gate. The visitor is recommended to proceed along the latter. From the Banyan to a broad gravelled carriage stand, the road is without trees by its sides, so that the full effect of the great tree is not interfered with. The best view

of the great tree is to be had from the middle of the Royle* avenue, which, by a semicircular sweep, connects the Banyan and the Roxburgh avenues. In the Royle avenue observe the tree of *Strychnos Nux-vomica*, Linn., the species which yields the well-known poison. Strychnine is an alkaloid which is obtained from the lozenge-like seeds which are contained in the beautiful orange-coloured pulpy fruits of this tree. Observe also trees of *Butea frondosa*, Roxb., the Dak or *Pallas*† tree, extremely common in some parts of India, and which has a gorgeous scarlet pea-like flower, much used as a dye-stuff. Observe also trees of *Cananga odorata*, Hook. fil. & Thoms., the flowers of which are the source of a scent much in favour with the Malayan population. Returning to the Banyan avenue, and walking along it towards the river, the visitor passes across the arm of a lake, and then between two rows of the She-oak of Australia (*Grevillea robusta*, A. Cunn.), a handsome little tree with singular fern-like leaves and still more singular tubular yellow flowers. The tree is not really an oak; it belongs to a family (*Proteaceæ*) which has not a single representative in the indigenous Flora of Europe. The wood of this *Grevillea* is beautifully mottled like a nutmeg, and is used in cabinet-work. On the left of the road opposite these She-oaks is the sheet of water already alluded to (page 17), and a good view of the Palm-house can be got across it. To the right of the road is a large group of trees, chiefly natives of the Andaman Islands. At the point where the Banyan avenue crosses the Hooker avenue, there is an open space overshadowed by a handsome young tree of *Terminalia Catappa*.

The visitor who intends to leave the Garden by the carriage road through Howrah should turn to the left towards Kyd's monument. The visitor who intends to leave the Garden by the river should proceed along the remaining part of the Banyan avenue to the Water gate.

In passing along this avenue towards that gate, there diverges on the right the *Scott Avenue*, which runs towards the river bank, where it joins the Roxburgh avenue. During the greater part of its length, the Scott avenue is lined by trees of *Sterculia alata*, Roxb., and *Swietenia macrophylla*, Linn., planted alternately. Near the junction of the Scott with the Banyan avenue, there is a tree of *Kigelia pinnata*, DC., a native of the west coast of

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* John Forbes Royle, M.D., F.R.S. of the Honourable East India Company's Medical Service, Superintendent of the Botanic Garden at Saharanpore from 1823 to 1831; died 1856; author of A Manual of Materia Medica; of a book on the Fibrous Plants of India; and of a work in two folio volumes, on the Botany of the Himalayas.

† This tree gives its name to the plain on which the battle of Plassy was fought by Clive in 1757.

Africa, which bears long racemes of maroon-coloured flowers, which are succeeded by fruits having a striking resemblance to Bologna sausages, and weighing several pounds each. This species is a rapid grower, and in the south of India it is utilized by the Forest Department for firewood plantations. To this individual tree of *Kigelia* a special interest attaches; for it was while standing under it with Mr. John Scott, on the morning of 9th January 1879, that Mr. Adolph Biermann, Curator of the Garden, was attacked by a tiger which, unnoticed by him or his companion, was crouching under the shrubbery which then occupied the opposite side of the road. The tiger had, a quarter of an hour earlier, escaped from the menagerie of the ex-King of Oudh, on the Calcutta side of the Hooghly, and had reached the Garden by swimming across the river. While Messrs. Biermann and Scott were standing under this Kigelia tree, observing some monkeys in a neighbouring teak tree, which were chattering in an excited manner (a common custom of theirs when any of the large carnivora are near), the tiger rushed from its cover and struck down Mr. Biermann by a blow of its paw, which at the same time detached about half his scalp. After surveying its victim for a few minutes, the tiger (which had been bred in captivity, and which had probably never killed before) returned to the cover from which it had emerged and lay down in full view of its prey. Mr. Scott, with splendid pluck, stood by his friend the whole time, and afterwards carried him off, under the very eyes of the savage brute, to the Superintendent's house. Mr. Biermann recovered from his scalp and other wounds, but about a year afterwards he died of cholera. Diverging from the Scott avenue and curving towards the Water gate is the *Biermann Avenue*, along which observe (near the bridge) a fine tree of one of the most graceful of Indian Figs (*Ficus Benjamina*, Linn., var. *comosa*) and many tall Casuarina trees, covered with gigantic climbing plants.

Returning to the Banyan avenue and walking along it towards the Water gate, observe a grove of mango trees (near the corner of which the *Jacquemont** and *Maingay*† *foot-paths* diverge). A good mango is usually esteemed the finest

* Victor Jacquemont, a distinguished French Botanist who travelled in Northern India during the years 1828 to 1831. He died of fever in India, and his collections, having been transmitted to Paris, were described by Decaisne, and the results were published in six quarto volumes. M. Jacquemont's letters, written while in India, give a most vivid account of the Botany of the North-Western Himalaya, and particularly of the social condition of India in those days.

† A. C. Maingay, M.D., of the Bengal Medical Service, an excellent and hardworking Botanist who, while he was Civil Surgeon of Malacca, made an extensive collection of the Flora of that province. Dr. Maingay was, on the transfer of the Straits Settlements to the Colonial Office, transferred to Rangoon, where he was murdered in 1869 by a convict during an outbreak in the jail. His extensive collections were sent to Kew, and the novelties in them were published by Sir J. D. Hooker in his Flora of British India.

of Indian fruits; while a bad mango is certainly one of the worst, there being innumerable degrees of merit between these two extremes. The mango (*Mangifera indica*, Linn.) belongs to a natural family of plants (*Anacardiaceæ*), which is represented in Europe by the Wig-plant (*Rhus cotinus*, Linn.) and the Pistachia (*Pistachia Lentiscus*, Linn.) The most notable Indian member of the family after the mango is *Semecarpus Anacardium*, Linn., of which a good specimen may be seen in the Falconer avenue (page 24). On the opposite side of the roadway from the mango grove observe a very large plant of the curious woody climber *Elæagnus conferta*, Roxb. The undersurfaces of the leaves of this plant are coated with beautiful silvery scales, and towards the beginning of the cold weather the *Elæagnus* bears an abundance of small white flowers which smell deliciously of clover. At the very end of the avenue is a tree of *Tectona Hamiltoniana*, Wall., the only other species of the genus to which the teak tree (*Tectona grandis*, Linn.) belongs. The *Jacquemont path* connects the Banyan and Hooker avenues; and the Maingay path connects the former with Kyd's monument: neither of these paths presents any noteworthy feature, and they need not be traversed.

The visitor who has followed the course of this guide book as far as the intersection of the Banyan and Hooker avenues described at page 21, and who wishes to return to Calcutta by carriage road through Howrah or along the river bank, should proceed from the point of intersection of those two avenues by the left (passing the ends of the Clarke and Jacquemont avenues) to Kyd's monument, from whence he should proceed along the Anderson avenue to the opening of the Dyer* avenue, which he should traverse.

The *Dyer Avenue* runs in a curving direction eastward and ends at the Palmyra bridge. At its western end observe, on the left, a collection of aquatic plants grown in large pans, and behind this the original trees of *Brownea ariza*, Benth., *B. coccinia*, Jacq., and *B. grandiceps*, Jacq., from which Scott's hybrids originated; also trees of *Amherstia nobilis*, Wall., *Magnolia grandiflora*, Linn., and bushes of two species of *Napoleona* (*N. imperialis.*, Beauv., and *N. Heudelottii*, A. Juss.) The flowers of *Napoleona* are borne on the branches and stem. In appearance they much resemble sea-anemones. On the right observe trees of *Albizzia paludosa*, *Cassia siamea*, Lamk., *Mammea americana*, Linn., and (at the point of intersection with the

* Named in honour of W. T. Thiselton Dyer, F.R.S., C.M.G., C.I.E., the present distinguished Director of the Great Natural Botanical Establishment at Kew, to whom the Superintendent of the Calcutta Garden is deeply indebted for much assistance in almost every department of Botanical enterprise.

Falconer avenue) a tree of *Pterocarpus indicus*, Willd., the species which yields the well-known padouk timber of Burma and the Andaman Islands. A little beyond the *Pterocarpus* tree the Dyer avenue ends at the Palmyra bridge. Before describing the route beyond this bridge, it may be convenient to describe the *Falconer Avenue*, which proceeds in a southerly direction from the Griffith road to the Water gate, crossing in its course the Kyd avenue. Towards the northern end of the Falconer avenue, observe a tree of *Gleditschia sinensis*, Lamk., a species which, when young, bears formidable spines on the stem; a good specimen of *Semecarpus Anacardium*, Linn. fil., the curious-looking fruit of which has a double use, the fruit itself being used in Hindu medicine, while, from the swollen peduncles of the fruit, a kind of writing ink is prepared—whence its familiar English name "Marking Nut." On the opposite side of the roadway, and a little removed from it, is a specimen of the Ordeal tree of Madagascar, *Cerbera Tanghin*, Hook. This plant belongs to the family of Dogbanes, and is a near ally of the English Periwinkle. Its juice is poisonous, and in Madagascar it was, in times not very remote from the present, the chief factor in a mode of administering the criminal law of that island, which had, to say the least of it, the great merit of simplicity. It used to be the custom in Madagascar to administer a certain amount of juice of this tree to a person charged with a crime. If the recipient of the dose died, he was assumed to have been guilty. If, on the other hand, he survived, the fact was accepted as proof positive of his innocence, and he was forthwith acquitted. Near the Ordeal tree there is a small collection of trees of *Ficus* of various sorts; also a very fine specimen of *Putranjiva Roxburghii*, Wall., the seeds of which are often strung as necklaces and worn by Brahmins. Close to the roadway is a large bush of *Zizyphus œnoplia*, Mill., a plant very common in the drier parts of India, which yields a small, rather pleasant, fruit known in the vernacular as *bher*, and to the European population as "The wild Jujube." After intersecting the Kyd avenue, the Falconer avenue passes, in a curving direction, towards the Water gate. Observe on the left, just at the point of intersection, a tree of *Cæsalpinia coriaria*, Willd., the pods of which form the "Divi-divi," so highly valued in Europe as a source of tannin; a tree of *Sterculia ornata*, Wall., which, at the beginning of the hot season, bears numerous panicles of most elegant ochre-coloured flowers, the pods which succeed the flowers being of a brilliant scarlet, tinged with rose. Beyond this the road skirts the Garden nursery, from which it is separated by a pond: it then passes under some trees of the sweet-blossomed and semi-sacred *Michelia champaca*, Linn., of *Ficus Rumphii*, Bl., and of some other species, and so to the Water gate (pages 2 and 21).

We now return to the *Palmyra Bridge*, a little to the eastward of which the road divides into two. The branch on the left (north) runs in an almost straight line to the Howrah gate, being lined on both sides by rows of what is known to Bengalis as the *Tar* or *Tari Gach*, to Europeans familiarly as the Palmyra Palm, and to Botanists as *Borassus flabellifer*, Linn. This palm is largely cultivated, especially in the south of India and Ceylon, as a source of toddy. Toddy is the sap of the tree which can readily be converted into sugar by inspissation, or into spirit by fermentation. This juice or sap is obtained by cutting across the inflorescence and collecting the fluid as it escapes for some days from the cut extremity. The utensils connected with the toddy industry are very curious; and they, as well as the products, may be seen in the Economic Museum in Calcutta. Toddy when first drawn is slightly sweet, and makes a not unpleasant drink. The immature seeds of this palm are much esteemed by the natives of Bengal. Their kernels have the texture and something of the appearance of an oyster; but alas! none of the flavour of that most estimable bivalve. Besides toddy, the Palmyra yield a very hard and durable timber. In the majority of the Palm family, the tissues of which the stem is composed are soft and speedily decay. But in the Palmyra, as also in the Cocoanut Palm (*Cocos nucifera*, Linn.), the stem-tissue is hard, and in the south of India, as also in Ceylon, Borassus stems are used as timber for house-building. It is said that in many of the Dutch buildings which still exist in Colombo there are Palmyra rafters which, although known to be several hundred years old, are still perfectly sound. The leaves are also largely used for writing upon. The Palmyra, in fact, shares with the cocoanut the merit of being the most useful Palm in India.

Instead, however, of leaving the garden by the Palmyra avenue, the visitor is recommended to follow the right bifurcation of the road after crossing the Palmyra bridge. This is the *Wight* Avenue*, which, after traversing the Palmetum, passes onwards to the Howrah gate.

The *Palmetum* is the part of the Garden which is principally devoted to the cultivation of Palms. Its western limit is formed by the elongated lake which the visitor has just crossed by the Palmyra bridge. Its northern boundary is the Palmyra avenue. On the east it is bounded by Kyd's avenue, and about its

* Robert Wight, M.D., F.R.S., a native of East Lothian, and a member of the Honourable Company's Madras Medical Establishment, an Indian Botanist of much distinction, who published, under the title *Icones Plantarum Indiæ Orientalis*, a book in six quarto volumes, in which no fewer than 2,100 species of Indian plants were illustrated and described. Dr. Wight also published *Spicilegium Nilghirense* and *Illustrations of Indian Botany*, both illustrated and both in quarto. In conjunction with Dr. Walker Arnott, Professor of Botany in the University of Glasgow, he issued the first volume of an admirable *Prodromus Floræ Orientalis* which unfortunately was never completed.

middle it is intersected diagonally by the Brandis avenue. Near the Palmyra bridge observe two plants of *Elaeis guineensis*, Jacq.—the oil-yielding Palm of the West Coast of Africa, and the source also of the well-known spirit called Arrack; and behind these a large group of Palms, containing a variety of species. On the other side of the road from this group observe another bold group of Palms, containing several good young specimens of *Corypha*. A little to the eastward, and also close to the side of the road, there is a group containing several fine specimens of *Oncosperma horrida*, Griff., with extremely prickly stems, and not far off a good, although small, specimen of the Egyptian Doum Palm (*Hyphœne Thebaica*, Mart.) Along the Brandis avenue are a number of species of *Phœnix*, including *P. leonensis*, Lodd, *P. acaulis*, Roxb., *P. paludosa*, Roxb., and *P. rupicola*, T. Anders.; and by the margin of an arm of the lake a small group, consisting chiefly of *Cocos schizophylla*, Mart., and behind that a larger group of the stately *Attalea speciosa*, Mart. Further to the east of Brandis avenue, and skirting Kyd's avenue, will be found several good specimens of the beautiful *Thrinax parviflora*, Swartz (a native of the West Indies); and also specimens of several other species of the same genus. In this neighbourhood also observe a large mass of the dwarf species *Rhapis flabelliformis*, Ait., from the middle of which projects a plant of *Caryota urens*, Linn. This *Caryota* is also a source of toddy in Eastern Bengal; and the petioles of its leaves are now beginning to be utilized as a substitute for whalebone in the manufacture of umbrellas. Adjoining this is a small group of *Sabal*, consisting chiefly of *S. Adansoni*, Guerns. At a short distance to the eastward is a group containing many plants of *Livistona chinensis*, R. Br., *L. rotundifolia*, Mart., and *L. Jenkinsiana Griff.* in it, while close beside is another group of which a plant of *Pritchardia pacifica.*, Seem. forms the centre. A third group in this neighbourhood consists of fan-leaved palms, of which the central one (rather overshadowed by the others) is *Hyphœne thebaica*, Mart. At the corner where Collett's avenue intersects Kyd's avenue, and not far from Wallich's monument, is a handsome group, the most notable members of which are plants of the Javan species *Corypha Gebanga*, Blume, and near this another group with good examples of *Corypha elata*, Roxb., is worthy of notice. Returning a little to the northwards, and crossing the Wight avenue, observe a group of Conifers, and a little beyond it a fine group of *Latania*, near which growing at the end of a lake is a fine plant of *Cyperus Papyrus*, Linn., and on the neighbouring mound a group of the wild date, *Phœnix sylvestris*, Roxb., and other palms. Observe also to the west of this a plant of *Hyphœne coriacea*, Gærtn.; also a number of plants of *Arenga saccharifera*, Labill., a Malayan species. From this last palm sugar is obtained in the Malayan countries, much in the same way as it

is got from *Borassus flabellifer*, Linn., in British India (page 25). The *Arenga*, in addition to sugar, yields, from the soft tissues of its stem, a kind of sago; while the fibres of the leaves afford an excellent material for making brushes and mats.

After traversing the Palmetum, the Wight avenue intersects the Collett avenue, and at the point of intersection it passes between two fine groups of palms. It then runs through a grove of tall trees, largely composed of *Casuarina equisitifolia*, Forst. This species of *Casuarina* is a native of the Andaman Islands and of the beaches of some parts of the Malayan Peninsula. In appearance it is very like Tamarisk, and has been named by the Bengalis *Bilati Jhao* (Foreign Tamarisk). It also somewhat resembles a pine; and occasionally it is called by Europeans (from its prevalence in the neighbourhood of the Garden) the Howrah pine. Botanically it is far removed from the Tamarisk, and it is not very closely allied to the pine. In fact, the *Casuarina* forms the type of a small natural family which has its head-quarters in Australia. The wood of this species, which, owing to its red colour is often called "beef wood," is dense, very hard, and it burns well. For the latter reason it is cultivated in some parts of India (*e.g.*, Madras) as a source of firewood. Scattered about in this grove are many interesting specimens, amongst which may be mentioned the tree which yields Poon spars, *Calophyllum Inophyllum; Artocarpus integrifolia*, Linn. (the Jak tree), the enormous malodorous infrutescences of which are much esteemed by some; *Hernandia peltata*, Meissn., an anomalous Laurel common on the Malayan littoral, and from the wood of which certain kinds of musical instruments are fashioned. Various interesting climbing plants are also to be found in this grove. Amongst these are—a *Landolphia* from Zanzibar, which is one of the sources of East African Caoutchouc; the Bridal creeper (*Porana paniculata*, Roxb.), famous for its large and lovely sprays of pure white, small, but very sweet, Convolvulus-like flowers; *Strophanthus dichotomus*, DC., with singular corollas, from the edges of which hang down long ringlet-like tassels; *Chonemorpha macrophylla*, G. Don., and *C. Griffithii*, Hook. fil., both sources of caoutchouc in Assam; with various others too numerous for mention. Here also may be seen various species of *Calamus*. The Calami are scandent branching Palms, usually armed with formidable spines. Their stems form the various kinds of cane so much used in wicker work and as walking sticks, the well-known "Penang lawyer" being derived from a Malayan species of this genus. In this grove are a few fine specimens of the Rain-tree (*Pithecolobium Saman*), from the leaves of which in the West Indies (as the legend has it) showers of rain sometimes fall while the sky is without a cloud; also some fine bushes of the shrub (*Coffea arabica*, Linn.), the seeds of which form *coffee*. A tree of the Carob-tree (*Ceratonia Siliqua*,

Linn.) is also to be seen here. The pods of this contain a sweet nutritious pulp. These are the "locust beans," on which John the Baptist fed in the wilderness, and hence the tree is often called *St. John's Bread Tree.* On the bank of the lake beyond this grove observe a tall tree with beautiful buff-coloured bark. This is *Albizzia procera*, Benth., a common tree in many parts of Northern India. Beneath the *Albizzia* grows a fine plant of *Amherstia nobilis*, Wall., the flowers of which have such a well-deserved reputation for beauty that the Duke of Devonshire (who made Chatsworth one of the finest gardens in the world) sent a collector to Burma fifty-four years ago to bring specimens of it to Chatsworth from that country, where alone it has been found wild. The introduction was successful; and one of the plants taken home by His Grace's collector is, I am told, still to be seen at Chatsworth. Near this is a superb young specimen of *Pterocarpus indicus*, Willd., a beautiful tree indigenous to various parts of Tropical Asia. Scattered about in this part of the Garden are several specimens of *Dalbergia Sissoo*, Roxb., a tree which yields one of the most useful timbers in India; one or two small trees of the allied species *Dalbergia latifolia*, Roxb., are also to be seen. From the wood of the latter the well-known "black-wood furniture" of Bombay is carved. A small tree of the Moreton Bay Chestnut (*Castenospermum australe*, A. Cunn.) and a fairly sized specimen of *Elaeocarpus aristatus*, Roxb., stand close to the road.

Near the small bridge across an arm of the lake is a plant of the medicinal *Quassia* (*Q. amara*, Linn.), the flowers of which are of a charming red colour, and on the opposite side of the road a tree of *Gynocardia odorata*, R. Br., the seeds of which yield an oil which has the reputation of having an alleviating effect on leprosy. Close by the roadway on the same side is a tree of *Aegle marmelos*, *Corr.* This tree is sacred to the god Shiva; it has a hard and useful wood of a bright yellow colour, and its fruits are like green oranges with bony rinds. Inside the rind the seeds are scattered in a stiff pulp, mixed with which are isolated masses of clear mucilage. The pulp is an admirable remedy in some stages of dysentery. In this neighbourhood there is a fine tree of the Australian *Erythrina vespertilio*, Lamk. The leaves of this have a strong resemblance to a bat with its wings outstretched, hence the specific name. Before the gate (called the *Howrah Gate*, see page 1) is reached the road passes between trees of the two sacred species of Ficus. That on the right is *Ficus bengalensis* or Banyan, a species venerated by Hindus, as has already been described (page 19). The tree on the left* is a Peepul (*F. religiosa*, Linn.), sacred to both Hindus and

* It was under a Peepul tree that Sakyamuni, the Buddha of the current cycle, and the founder of the Buddhistic religion, is said to have become incarnate; and under Peepuls he chiefly lived and taught.

Buddhists. Unlike the Banyan, the peepul throws down no aërial roots from its branches. But it has a similar habit of beginning life on other trees or on buildings—in fact, almost anywhere rather than on the ground. This curious epiphytal habit, which the Peepul and Banyan (as well as some other species) have of beginning life, is rendered possible by the fact that many birds are very fond of their figs; and that the small seeds inside the figs (being hard and indigestible) are voided with their germinating power unaffected by the birds which have eaten them. The seeds are thus often deposited in spots far removed from the ground, and in these the seeds germinate and the seedlings are developed and continue to grow until they ultimately reach the ground. Seedling fig-trees developed on buildings in the tropics disintegrate the masonry more effectually than even frost does in temperate climates. In fact, ancient buildings in India have no greater enemies to contend with than such seedling fig trees. In like manner, both the banyan and peepul frequently begin life on the tops of other trees which they choke and gradually supplant. The leaf of the peepul has a curious elongated point, which is very characteristic: the fig is small, dark-coloured, and is of about the size of a large pea. This tree is treated with the greatest respect by good Hindus, and is frequently an object of worship.

In the wide gravelled space near the Howrah gate stands a teak tree (*Tectona grandis*, Linn.) This is a small specimen compared to the giants which occur in the forests of Southern India and Upper Burma, where the species is wild. It is unnecessary to dilate here on the value of teak timber. Fully alive to it, the Honourable the East India Company endeavoured, in the early years of this Garden, to establish a teak plantation on the land lying between the present eastern boundary of the Garden (which the visitor has now reached) and Shalimar (*see* page 5). During the rainy season its handsome panicles of white flowers give the teak a certain amount of beauty. As soon, however, as the rains end, its leaves begin to become discoloured; and as they are almost universally attacked by a fungus, the tree during the greater part of the year is an eye-sore.

If the visitor desires to return to Calcutta by the road which runs through the Sibpur and Howrah bazars, he should leave the Garden by the gate which he has now reached. If, however, he desires to return by the riverside road (described at page 1), he should pass to the right (south) along the Hamilton avenue, and thus reach the College gate, by which he is supposed to have entered the Garden.

Herbarium.—The building in which is contained the Herbarium (or collection of dried plants) is approached by the Hooker* avenue (one of the finest roads in the Garden), which runs southwards from Kyd's monument towards the river bank. Along the Hooker avenue are many fine trees worthy of notice. Chief amongst these is the magnificent specimen of *Dipterocarpus alatus*, Roxb., which towers above everything near it; the clear grey-barked stem being without a branch for 60 feet. Close to the roadway, on the west side, are some trees of *Spathodea campanulata*, P. Bev., which during several weeks in the year bear a profusion of large blossoms of the most vivid crimson colour. Further along are two trees of *Albizza stipulata*, Boiv., and a little off the road a large specimen of wild cinnamon (*Cinnamomum iners*, Reinw.) The present Herbarium building was erected in 1883. In it are arranged, in scientific order, a very complete collection of dried specimens of the plants of the Indian Empire, as also fair collections of those of Asia outside India, of Europe, and of Australia; the plants of Africa and America being far less perfectly represented. The collection has no popular interest whatever, as plants lose all their beauty when dried. But to the systematic botanist the Herbarium ought to be one of the most interesting spots in Asia. The building is open only to students, who are admitted on application to the Superintendent.

* Named in honour of Sir Joseph Dalton Hooker, K.C.S.I., C.B., F.R.S., &c., &c., the greatest living systematic Botanist, to whom, of all others, the Calcutta Herbarium is most deeply indebted. Sir Joseph was for many years Director of the Royal Garden, Kew; was President of the Royal Society from 1874 to 1879; is the editor and chief author of the *Flora of British India*, published under the authority of the Secretary of State, of which six volumes have already been issued, and a seventh is in preparation; author of two splendidly illustrated folio volumes on the Rhododendrons and other plants of the Sikkim-Himalaya; is editor of the *Botanical Magazine* and of the *Index Kewensis;* and joint-author, with the late Mr. G. Bentham, of the most important English Botanical work of the century, viz., the *Genera Plantarum*.

RULES FOR THE MANAGEMENT, PRESERVATION AND REGULATING THE USE OF THE ROYAL BOTANICAL GARDEN, CALCUTTA.

NOTIFICATION.

No. 3699Mis.—The 26th July 1904.—In exercise of the power conferred by section 4, sub-section (1), of the Public Parks Act, II (B.C.) of 1904, the Lieutenant-Governor is pleased to make the following rules for the management, preservation, and regulating the use, of the Royal Botanic Garden, Calcutta :—

Howrah.

Rules under section 4 of Act II (B.C.) of 1904 for the management, preservation and regulating the use of the Royal Botanic Garden, Calcutta.

1. The garden is open free to the public every day from sunrise to half an hour after sunset, but no child under ten years of age will be admitted unless accompanied by a parent or suitable person in charge, and no person shall, without the special permission of the Superintendent, enter or remain in the garden between half an hour after sunset and sunrise.

2. There is no thoroughfare or right of way of any sort through the garden, and no person shall, without permission of the Superintendent, enter any part of the garden or any building which is marked private or reserved, permanently or temporarily, for the Superintendent or the employés of the garden.

3. Visitors in launches and boats are permitted to land only at the floating landing stage at the water gate; only foot-passengers are permitted on the landing stage and its gangway.

4. No launches or boats are allowed to lie at the floating landing stage except while actually discharging or embarking passengers; at all other times they must moor well clear of it.

5. Visitors in carriages or motor-cars, on horseback or on bicycles are admitted, but driving and riding at a rapid pace, or on the grass, flower-beds and narrow paths, or on the road from the water gate to Kyd's Monument are prohibited.

6. Carriage cattle may be unyoked and carriages may stand in certain places set apart for these purposes; in all other parts of the garden the standing of carriages and the unyoking of carriage cattle are prohibited.

7. The grazing of horses, ponies or cattle within the garden is prohibited.

8 Picnic parties and other pleasure parties visiting the garden can have suitable places pointed out to them on application to the Curator, from whom also permission can be obtained to pitch tents in suitable places, provided no plants are injured.

9. The use of one of the pleasure houses near the flower garden can be reserved by parties who apply in writing to the Curator and pay the prescribed fee; the right of occupation will be regulated by priority of application.

10. No person shall light a fire in the garden without permission; and cooking is allowed only at spots which will be pointed out by the park durwans.

11. No person or picnic party shall leave glass, paper or litter of any kind in the garden.

12. No. person shall gather flowers or fruit or leaves, or uproot plants or trees or break branches, or cut names or marks upon trees or seats, or destroy labels, or disfigure monuments or buildings, or otherwise injure anything in the garden.

13. No person shall shoot with any weapon at marks, birds or animals in the garden.

14. No person shall bird-nest or fish in the garden.

15. No person shall bathe or wash himself or his clothes in the garden or otherwise pollute the water in the garden ponds and lakes.

16. No person or persons shall hold a public meeting or deliver addresses of any kind, or cause a crowd to collect, or form a procession of any kind, or beg, or carry on any trade in the garden.

17. No person or persons shall, without permission of the Superintendent, play games or hold sports, or dance or give musical performances in the garden.

18. No person in a state of intoxication shall remain in the garden, and no person shall behave in a disorderly manner, or create or take part in any disturbance or commit any act in violation of public decency, or use profane, indecent or obscene language to the annoyance of other persons using the garden.

19. No person shall interfere with or disturb the people employed in the garden, or purchase any kind of garden produce from them, or offer money or presents of any sort to any garden employé.

20. Visitors desiring to purchase plants are to apply to the Curator of the garden, whose office is on the river bank to the east of the water gate; only surplus plants are available for sale, and nothing can be bought on Sundays or holidays.

21. No garden produce is allowed to be removed from the garden unless accompanied by a pass from the Curator of the garden. The park durwans at the garden gates have orders to detain anything being taken out without such a pass.

22. Any person committing a breach of any of the above rules shall, on conviction, be liable to be punished with fine which may extend to twenty rupees.

L. P. SHIRRES,
Secy. to the Govt. of Bengal.

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ANNALS

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„ II.—Synœcia, Sycidium, Covellia, Eusyce, Neomorphe.

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